

THE LARVA OF *NOTOSTIGMA*
(HYMENOPTERA: FORMICIDAE: FORMICINAE)

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Abstract.—The larvae of worker and sexual castes of the ant *Notostigma carazzii* from Australia are described and illustrated.

We have studied the larvae of 182 genera of ants; that leaves about a hundred genera still to be done. In our 1986 supplement (p. 697) we complained that "our stream of incoming larvae has dwindled to a mere trickle." When we complained to a young colleague that we were not getting additional genera, he replied that the genera we had "not studied were those whose nests are found only by accident So we looked up the history of the 103 genera which we have not studied: 62% have been reported only once (probably the type nest or only the type specimen), 23% we consider rare and only 15% common."

The chief purpose of the above preamble is to let the reader know how grateful we are to our Australian colleague, Dr. R. W. Taylor, for sending us 160 larvae and 6 workers of that extraordinary ant *Notostigma carazzii*.

Collection data. N. Queensland. Boar Pocket, 17°10'S, 145°39'E, in rain forest, nesting in soil, 720 m elevation. Collected by R. W. Taylor, S. Higashi and T. Matsumoto.

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Caution. The reliable determination of instar, caste and sex of larvae requires the following specimens: a first-instar larva inside an egg ready to hatch; a second-instar larva inside a first-instar ready to moult; a third-instar larva inside a second-instar larva ready to moult, etc.; and finally a mature larva. Maturity is proved by a prepupa, which will reveal all characters of a mature larva except shape. For further confirmation a worker pupa or a worker is desirable to check size. If the worker caste is polymorphic, a prepupa of each size is required. Mature sexual larvae can be recognized only from prepupae ready to moult to pupae. For immature sexuals we have no rule.

From the above paragraph it follows that even with this magnificent collection of *Notostigma* larvae we cannot determine instars, castes or sex.

Genus *NOTOSTIGMA* Emery

Profile pogonomymrmecoid (i.e., diameter greatest near middle of abdomen, decreasing gradually toward anterior end and more rapidly toward posterior end, which is rounded; thorax more slender than abdomen and forming a neck, which is curved ventrally). Praesaepium lacking. Body hairs dense, mostly 2- to 4-branched. Head hairs numerous, mostly unbranched. Labrum deeply bilobed; chiloscleres lacking.

Mandibles camponotoid (i.e., base broad, its width at least $\frac{2}{3}$ the length; apex forming a small short tooth; no medial teeth; medial border erose).

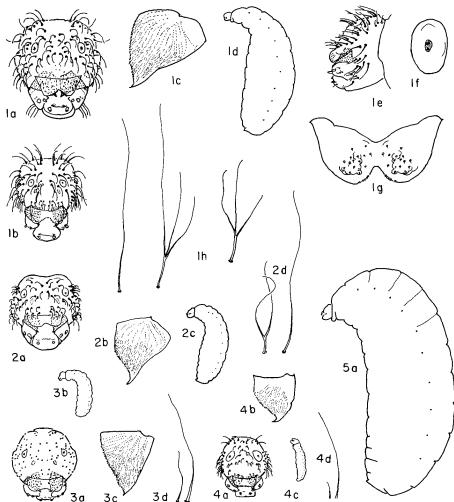
Notostigma carazzii (Emery)

Mature (?) worker larvae. Length (through spiracles) 8.3–15.4 mm. Profile pogonomyrmecoid; anus with a small posterior lip; gonopod vestiges on AVIII and AIX; 13 differentiated somites. Spiracles on T2 0.035 mm in diameter, decreasing slightly posteriorly. Integument on venter of anterior somites with spinules in short transverse rows. Body hairs dense (too dense to draw), the longest with flexuous tips, and uniformly distributed; of 2 types: (1) numerous, 0.1–0.35 mm long, 2- to 4-branched; (2) few, 0.13–0.3 mm long, unbranched. Cranium subhexagonal, broader than long, with bulging genae and a pair of small swellings near dorsal surface; clypeus and labrum slightly swollen anteriorly. Antennae just above midlength of cranium; with 3 sensilla mounted on a small sclerotized knob, which is seated on a large slight elevation. Head hairs numerous (about 110); 0.125–0.25 mm long; mostly unbranched, a few bifid or with bifid tip. Labrum deeply bilobed; anterior surface of each lobe with an irregular swelling bearing about 14 short hairs or spinulose sensilla; ventral surface with 4 sclerotized sensilla and with short rows of spinules medially; entire posterior spinulose dorsally and with numerous ridges arranged in rows which radiate from the dorsolateral angles and with about 14 small isolated sensilla. Mandible camponotoid; heavily sclerotized; apex short and curved medially, with numerous short sublongitudinal ridges on anterior surface; posterior surface with ridges sublongitudinal ventrally but curving to transverse at about midlength; medial border erose. Maxilla with conoidal apex, covered with short rows of minute spinules, palp paxilliform with 5 (2 apical with a spinule each and 3 lateral) sensilla; galea digitiform with 2 apical sensilla. Labium with moderately long, rather numerous rows of minute spinules medially; lateral surfaces with numerous short arcuate ridges; palp paxilliform with 5 (2 apical and with a spinule each and 3 lateral) sensilla; opening of sericteries a wide transverse slit with a recurved sclerotized bar at each end. Hypopharynx densely spinulose; the spinules arranged in subtransverse rows, the rows grouped in 2 subtriangles which have their bases near the middle, the spinules so long and the rows so close together that the spinules overlap.

Immature (?) larvae. Length (through spiracles) 8.7–10.3 mm. Similar to mature (?) larva except as follows. Body more slender. Body hairs (1) few, 0.05–0.4 mm, 2- to 4-branched; (2) numerous, 0.005–0.4 mm, unbranched. Head hairs less numerous (about 97), 0.05–0.2 mm long, unbranched, flexuous. Palp a short peg.

Young larva. Length (through spiracles) 5.4–10.2 mm. Similar to immature (?) larva except as follows. Body more slender. Integument with sparse minute spinules of AX also. Body hairs less numerous (but too dense to draw), of 2 types: (1) very few, 0.05–0.4 mm long, bifid or with bifid tip; (2) numerous, unbranched. Head hairs slightly less numerous (about 94); 0.1–0.2 mm long, with flexuous tip. Maxillary palp a skewed sclerotized knob; galea a frustum. Labium with a few short rows of minute spinules; palp a skewed frustum; opening of sericteries a short transverse slit, a pair of low knobs lateral to opening.

Very young larvae. Length (through spiracles) about 3.7 mm. Similar to young larva except as follows. Body nearly straight and of same diameter throughout; head



Figs. 1-5. 1. Mature (?) larva. a, Large head in anterior view, $\times 25$; b, small head in anterior view, $\times 25$; c, left mandible in anterior view, $\times 76$; d, larva in side view (hairs omitted), $\times 3$; e, head in side view, $\times 25$; f, left antenna in anterior view, $\times 100$; g, labrum in anterior view, $\times 100$; h, one unbranched and 2 branched body hairs, $\times 100$. 2. Immature worker larva. a, Head in anterior view, $\times 25$; b, left mandible in anterior view, $\times 76$; c, larva in side view (hairs omitted), $\times 3$; d, 2 body hairs, $\times 100$. 3. Young larva. a, Head in anterior view, $\times 25$; b, larva in side view (hairs omitted), $\times 3$; c, left mandible in anterior view, $\times 76$; d, 2 body hairs, $\times 100$. 4. Very young larva. a, Head in anterior view, $\times 25$; b, left mandible in anterior view, $\times 100$; c, larva in side view (hairs omitted), $\times 3$; d, 2 body hairs, $\times 100$. 5. Sexual (?) larva. a, larva in side view (hairs omitted), $\times 3$.

on anterior end and of about same diameter as body; anus ventral. Integument with spinules in short rows on dorsum of AVIII to AX and with a few on venter of thorax. Body hairs fewer (but too numerous to draw) on T1-T3 and AI-AIII (decreasing in number toward AIII); 0.025-0.25 mm long, the longest with flexuous tips; most unbranched, a very few bifid. Cranium with slightly bulging genae. Head hairs fewer (about 80); 0.036-0.12 mm long. Labrum feebly bilobed; each lobe with about 11 sensilla on a slight elevation, ventral surface with 5 sensilla. Maxilla with round-pointed apex bearing a few minute spinules; palp a sclerotized slight elevation; galea a sclerotized slight elevation; opening of sericteries a short transverse slit. Hypopharynx with numerous fine short ridges, which are arranged in rows radiating from dorsolateral angles.

Sexual (?) larvae. Length (through spiracles) 17-23 mm. Similar to mature (?) larva except as follows: Body hairs less numerous (but too numerous to draw); 0.2-0.3 mm long; similar to hairs on young larva but with thicker base. Of 2 types (1) most numerous, unbranched; (2) very few, bifid or bifid-tipped. Head hairs more numerous (about 116); 0.1-0.225 mm long; unbranched. Spinules on posterior surface of labrum more numerous and longer dorsally. Apex of maxilla conoidal and with numerous short rows of minute spinules. Hypopharynx with more numerous rows of longer spinules dorsally. (We suspect that these large larvae are sexual because of their size but they have the hairs of immature larvae.)

In our key to ant larvae (1976:72) the larva of *Notostigma* keys to Formicinae but not to the tribe Camponotini to which it has been assigned, because it lacks chiloscleres. Therefore it must be lumped with five inseparable tribes under 27b on p. 73.

The tribe Camponotini contains 11 genera: 8 of which we have studied (*Calomyrmex*, *Camponotus*, *Colobopsis*, *Dendromyrmex*, *Echinopla*, *Notostigma*, *Opisthopsis* and *Polyrhachis*) and 3 which we have not seen (*Forelophilus*, *Overbeckia* and *Phasmomyrmex*). All those studied, except *Notostigma*, possess chiloscleres and a praesaepium, which are found nowhere else among ant larvae. Furthermore the specialization index for *Notostigma* is 18, whereas the average for the other 7 is 22, with 20 as the lowest.

Can it be, therefore, that *Notostigma* is misplaced? We do not think that larval characters should get priority. But when the unique characters are found in a majority of the genera of a tribe but are lacking in one genus, the adults should be restudied.

LITERATURE CITED

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